

Vol. XXXIV.

Transaction

Part I.

The Engineering Institute of Canada

Incorporated 1887

28

The Canadian Society of Civil Engineers

PRESIDENTIAL ADDRESS

BY

LT. COL. R. W. LEONARD, M.E.I.C.

ANNUAL MEETING, MONTREAL, JAN. 27TH, 1920

TA

155

L58

MONTREAL

1920

Civil
Engineering Library
School of Mining

The Right of Publication and Translation is Reserved

RETIRING PRESIDENT'S ADDRESS

—

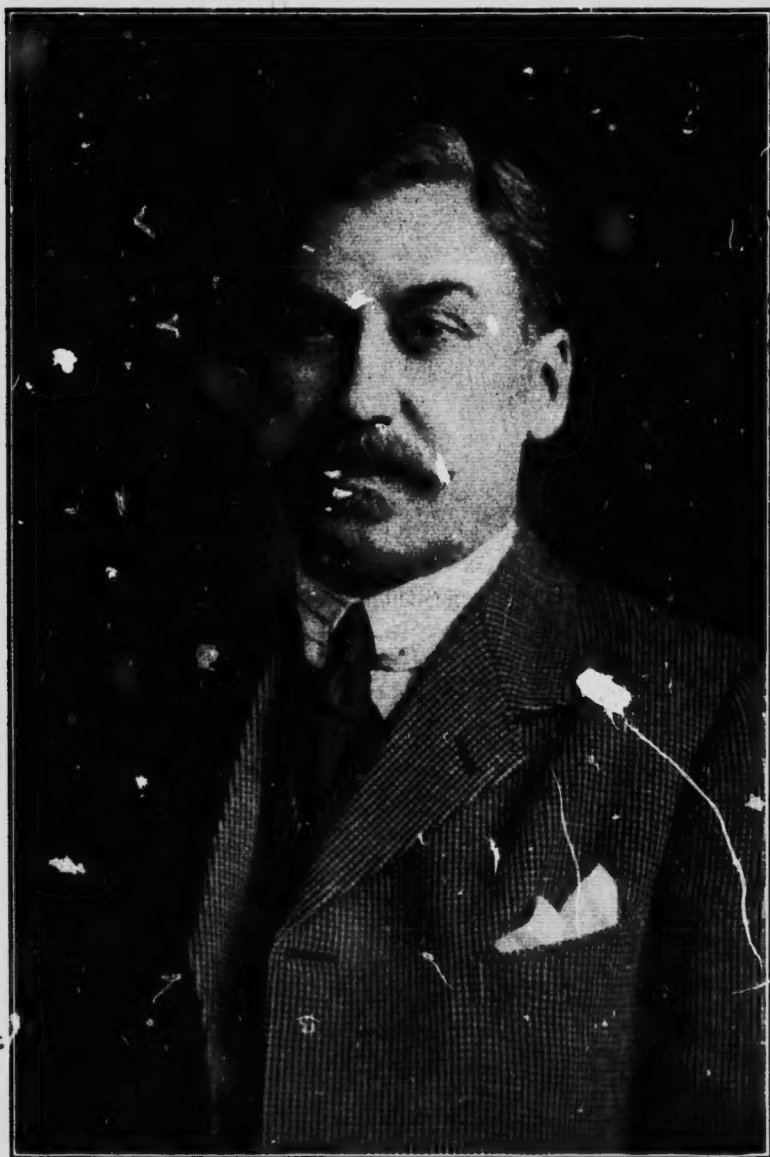
LT. COL. R. W. LEONARD

RETIRING PRESIDENT

—

MONTREAL

JANUARY 27TH. 1920



LT. COL. R. W. LEONARD, M.E.I.C.

PRESIDENT, 1919

THE ENGINEERING INSTITUTE OF CANADA.

PRESIDENTIAL ADDRESS

LT. COL. R. W. LEONARD, M.E.I.C.

MONTREAL

JANUARY 27TH, 1920

THE very high honour which you conferred upon me a year ago in electing me President of this *Institute* for the year 1919, is a distinction which I value most highly. The office has entailed much responsibility and many onerous duties, in connection with which I take this opportunity of acknowledging, with sincere appreciation, the enthusiastic energy of our Secretary, Mr. Keith, and the hearty co-operation and most valuable assistance rendered by the Vice-Presidents and the Council.

The constant and untiring attention devoted by the members of Council to the large problems and the many details involved in the management of this *Institute*, with its rapid growth in membership and functions—necessitating the “burning of the midnight oil” on frequent occasions at Headquarters, and the carrying on of a great deal of correspondence and telephonic communication daily—has amply demonstrated the keen interest which is being taken in the present work and ensures the future success and prosperity of our new *Institute*.

The last, but not the least duty, which custom has required of your President has been the delivery of a Retiring Address, and when I look back upon the high standard and importance of the Addresses of some of my worthy predecessors, and the enormous field now covered by the profession, I feel that this is a duty not to be taken lightly and one which can be looked forward to only with trepidation. The greatest difficulty is to determine what subjects to select and where to stop.

Developments in Engineering

In the wonderful and rapidly-changing age in which we live ("Reconstruction" being the generally accepted term for the immediate changes which are taking place), I feel that it would not be amiss at this time to review briefly some of the more important changes or developments in the various departments of engineering—especially as our *Institute* now embraces all branches of the profession—and consider how they affect the members of it, individually and collectively.

The necessity, created by the War for rapid and unprecedented improvements in many arts and sciences has wrought changes which will prove of great benefit in the arts of peace, and if the war has had any redeeming features, the improved relations between the various classes of the community and the great strides in advance which it has impelled in scientific and industrial pursuits, are results which cannot be overlooked.

It is said by some that the engineers won the war; but, as there are many claimants to that distinction, the members of our modest profession will be content if they are accorded credit for the part they have taken in the trenches, the laboratories and the workshops. That aid has not been restricted to any one branch of warfare, but has been as diversified as are the many branches of the engineering profession, extending from aeronautics to submarine navigation, and including the design, manufacture and operation of all manner of munitions and vehicles of transport by air, land and sea. Nor should we overlook the equally essential work of sanitation and water supply over the great area of the war zone.

Mention should also be made of the splendid service of your Vice-President, Mr. Haultain, in connection with the work of Soldiers' Civil Re-Establishment.

During the year we have welcomed home, with thankful hearts, the large number of our Members who have rendered such notable service in the great War, and last year we sadly unveiled an Honour Roll in the entrance of our Head Office to the memory of those Members who gave up their lives for the cause.

Reconstruction

Well, if this is the period of "Reconstruction," let us start at the beginning. Sir Oliver Lodge is quoted as saying: "The Universe has been in labour for a hundred million years, and has produced—us! We are a remarkable product and we are behaving at the present moment in a remarkable manner." Of course, he speaks of only what we can comprehend. The ant is so blind that he cannot see the man who observes his diminutive habitation.

We are behaving in a remarkable manner partly because our education has been of a remarkable character and partly because we have recently allowed ourselves to be unduly influenced by a few noisy and peculiar people who have been very badly educated. The recent Educational Conference at Winnipeg is a remarkable indication of the recognition by many thinking people of the great needs of our times. We have left untaught much fundamental knowledge which should have been taught and we have taught much that should have been left untaught, and there is an apparent lack of national sanity in us.

A few years ago it would have been unnecessary to deal with the fundamentals of our civilization; they were so imbued in our beings that it was almost silly to formulate them into words. We rested securely in the belief that "Truth is might and will prevail." Of late, however, so much false teaching and distortion of fundamental truths has been disseminated, and accepted by so many, that downtrodden Truth would appear to need the assistance of some Minister of Propaganda if she is to hold her place and prevail before the structure of our civilization is badly shaken. Sound economic doctrine is just as much the foundation of the engineer's professional education as mathematics and physics.

Men are not born equal

We have the much-taught doctrine that "all men are born "equal," which is an obvious fallacy. It is a self-evident fact that there is as great natural inequality—physically and mentally—in the different branches of the human race as in any other species of the animal kingdom. This difference greatly increased by the moral and spiritual

inequalities of the human race—is influenced again and emphasized by environment and education from the cradle to the grave. The very men who ignorantly preach that one man is as able as another and as well qualified to rule or hold office—that race and family count for naught—will spare no pains, in breeding his live stock to select parents having certain desired characteristics of disposition and physique.

G. F. Swain, late President of the American Society of Civil Engineers, in his Address at their Ottawa Convention in 1913, made the following remarks:—

“Equality of condition means pauperism or savagery; the inequality of man means the division of labor, progress and civilization.

“In the second place we should encourage the recognition and admiration of superiority.

“In the third place, we should preach the gospel of content instead of discontent. “Do violence to no man, neither exact anything wrongfully; and be content with your wages”, said John the Baptist. There are two kinds of discontent, one praiseworthy; one ignoble. The former springs from a laudable ambition, and a desire to perfect oneself so far as natural endowment will permit. The other springs from envy and the desire to reap the rewards of the industry of others. The former kind of discontent is to be encouraged; every man should be given an opportunity to develop himself and to be confirmed in the possession of the prizes which he may gain; but the discontent which springs from envy, which leads men to depend on Government help instead of self-help, which sanctions form of unjust taxation which may be nothing less than legalized robbery, should in every possible way, be repressed. The attention of men, instead of being concentrated on what they want, should be directed to a realization of what they have. In contrast with the conditions which existed one or two centuries ago, even the conditions of the poorest classes at the present time are immensely improved. Yet with all the reduction in working hours that has taken place in the last fifty years, and the other improvements in conditions, I doubt if there is any more real happiness and content among the poorer classes. Nor have I any doubt that the

excessive talk about bettering the condition of the working classes blinds them to the opportunities for their own thrift and industry."

When I begin to quote Mr. Swain's very notable Address I scarcely know where to stop. I commend it all to you as a splendid example of a well-reasoned statement of social conditions which does justice to the disciplined and trained mind of the educated engineer.

The value of such expedients as Old Age Pensions, Unemployment Insurance, etc., may be overestimated, as they must tend to increase a spirit of irresponsibility and extravagance, to lessen the incentive to thrift, to encourage carelessness in quality of work performed, and to reduce the sense of filial responsibility. Such results do not tend to advance our civilization.

"The hand of the diligent shall bear rule, but the slothful shall be under tribute."—Proverbs XIII 24.

A popular cry of the ignorant, uneducated "socialist" is: "Why should the many support the few." All thinking men know that it is the few who have the energy, intelligence, courage and enterprise to overcome the great natural obstacles that frequently lie in the road to success—to explore the unknown wastes of the earth and make them accessible to man, and to delve into the hidden resources of nature, geographical, geological, physical and chemical, and force her to yield up her undiscovered secrets, and who, through their natural and acquired ability to develop and harness nature's great resources to serve the needs of man, are creating industry and the benefits of industry for the great masses of the people. We realize now in greater measure than ever before that the labour of the explorer, the inventor, the organizer, the manager and the skilled and unskilled workmen is most urgently required to restore the world's wealth, wasted in war, and to build up again a well-balanced economic and social structure. Achievement along such lines is deserving of honour and distinction, and of the wealth which properly accrues from such accomplishments, for these rewards constitute the foundation stones of the arch of civilization, just as industry, integrity and thrift form the arch stones. It was the tearing out of these arch stones that was largely responsible for the fall of the ancient civilizations of Greece and Rome; it is the tearing away of the foundation stones that has caused the utter collapse of Russia, as we see her to day.

On our own Continent we have to day attempts by the ignorant and misguided to destroy both the foundation and arch stones of our industry and civilization, and at times it would appear that some temporary progress were attending their efforts. Therefore, it behooves the educated, who realize the dire consequences which must follow any such success—and especially the engineers who have, perhaps, a keener and deeper realization of the physical and economic consequences—to fortify themselves with a thorough knowledge of the subject and prepare to resist such dangerous tendencies as threaten the glorious arch of civilization as we have it to day.

Capital and Labour

The foundation stones may be popularly (though loosely and incorrectly) described as "Capital" and the arch stones as "Labour." Each is dependent on the other. I say "may be popularly described," because every man who possesses a constructive mind or owns one dollar's worth of any useful commodity or one dollar in money, is a capitalist; and every man who works, mentally or physically, is a labourer. But the man upon whose work of eight or ten hours per day depends the well-being of himself and those dependent upon him only, cannot be counted of the same value to society as the one upon whose enterprise, ability and industry depends the well-being of a factory full of employees and their families by maintaining the factory in continuous operation on a profitable basis.

In the Bulletin of the A. I. M. & M. E. for May, 1919, Calvert Townley, President, is quoted as follows:—

"We emerge from war time into a political unrest where the voice of reason is drowned between the clamor of labour and the sentimental appeals of the soft-hearted reformer. Never has the clear reasoning of the engineer been more in demand; never was an occasion when the trained brain which thinks things through, back from the eternal principles to the inevitable consequences, so much needed as at present.

"We need the engineer's clear thought, always working from cause to effect, constantly voiced in the open, to help neutralize the poison of these soft-hearted reformers, who face not facts as they are,

but think them as they wish them to be. We need the engineer's clear reasoning to call not only their own minds, but the world, back to some elemental truths.

"That the hand deserves not the same reward as the brains; that there is no justice in a demand to share profits unless losses be divided; that there is no partnership where gains and not risks are shared; that no wages are earned or can endure that are not fully reproduced in product; that there is no great limitless body of wealth that can continue to pay labour which does not reproduce its wage plus a profit to be added to accumulated capital; that all products are the result of joint effort of brains and labour, plus capital and opportunity, and that all of these, save the last, must share the output or the industry shortly ceases.

"We need fearless men who, in the market-place and from the house-top, will force back to the knowledge of the world: that since the beginning of history brains have ruled brawn; that the brain deserves and in the ultimate will inevitably receive greater reward than the hand; that any proposed condition that puts brawn over brains plans the pyramid on its apex and necessarily is one of unstable equilibrium."

"Labour Unrest" is largely the result of failure or refusal to recognize such facts and conditions as fundamentally right. The workers are led, by observation of occasional large returns upon capital (always featured in our newspapers with sensational head-lines) to ignore the risk and more frequent losses incident to industry—(hidden in very small print, if mentioned at all). The taxation of excess profits has incited the worker to seek a share in these profits, while overlooking the logical conclusion that they would necessarily require also to share in the losses, as it is difficult to understand how partnership in industry can long exist without joint distribution of the risks as well as the rewards.

Occasionally one hears of apparent success in some scheme of profit-sharing, joint industrial councils or suggestion of "sweating the machinery instead of the men," and doubtless there are some industries to which such schemes can be adapted so long as the results of

operation are profitable. In the event of losses, however (if only over a short period of time), I fear that the system would not long survive such treatment. I defy any engineer to tell me how to "sweat" a pick and shovel without some measure of perspiration on the part of the wielder thereof.

Under many of the proposed schemes it would be difficult to obtain the labour necessary to start a new enterprise or to continue an established one during a time of temporary business depression.

A great part of what is termed "common labour" in this country does not understand our language, our laws or our business methods, beyond the signing of a name or marking of a cross on the pay-roll at regular intervals; and the meaning of a stock certificate would be utterly beyond their comprehension.

As ability to understand what, to him, are the intricacies of business as applied to profit-sharing, etc., is absolutely essential to the success of such schemes, and as practically the only education these men receive in this direction is such as is instilled into them by agitators who find fomenting industrial strife a much pleasanter occupation than working for a living, the prospects for the general successful adoption of these innovations is not bright.

If solutions are possible whereby the lot of the working man can be improved, the engineer—whose training and life-work are devoted to the solution of practical problems—is most capable of finding them.

Engineers know, as well as the intelligent workmen, how fictitious are most of the alleged grievances in many of the recent strikes. These workmen, perhaps, are not to be too severely criticised if they are content to accept any immediate advantage that may be secured by means of some temporary trouble. The frequent argument that "If all vote for a strike there won't be any" is very seductive.

All mankind tends to crystallize into tribes or factions under a leader. Sometimes the employer, by his strength of character or fair dealings, commends himself to the employees as a leader, and in such cases there is seldom serious labour troubles. Lacking this condition the men select their own leaders and—as frequently in democracies—the selection is not always of the wisest or most

moderate man. This leader in order to justify himself works day and night and Sundays to find trouble, in the solution of which he can demonstrate his fitness for the job.

Until the wise heads in the Unions get together, take control and educate the others along lines of duty and honest service to their fellow men, there can be no industrial peace.

Class Legislation

The present tendency appears to be toward the obtaining of special legislation and privileges for highly organized bodies of labour beyond its proportionate value, which, if continued, must result in the eventual extinction of the particular Union, Trade or Business involved, just as the Trade Guilds of the Middle Ages perished, and as the stone-cutter's trade dwindled when concrete took the place of cut stone. A striking example is the headway that the use of concrete is making for house-building in England as a result of the "ca-canny" of the Bricklayers' Unions, which is largely responsible for the increased cost, and, therefore, the rent, of the labourer's cottage.

W. R. Ingalls, in an admirable Address before the Canadian Mining Institute in May last, cites the case very clearly, as follows:—

"It was the theory of Karl Marx, from whose teachings are derived so many of the fallacies of the present time, that labour, in its narrowest sense, produces everything, and, therefore that labour should have all that it produces. That idea is frequently expressed now, all over the world. We have already seen that labour gets almost all as it is, and what remains it would not get, for if profits for example are the reward of intelligence, the removal of intelligence would remove profits also. So long as the world was dependent upon mere man-power there was no very great advance in the wealth of nations beyond what was due to increase in population. There is no good reason to believe that an Englishman in the reign of George I. could carry any more weight per hour or for any more hours, or could exhibit any other superiority of physical power than an Englishman in the time of William the Conqueror. The great increase in production has

happened during the last century and a quarter, and has not been because men have grown any stronger, but because mind has taught labour how to become more effective and has provided it with machines and with organization. It is the minds of the captains that have produced the great increase in wealth and to those captains might reasonably have accrued all that they earned, but the economic principle that labour is the residual claimant prevented any such result, even if it were desired. The income of England in 1801 was about £180,000,000. The income of the United Kingdom, at the same rate but allowing for the increase in population, in 1907, would have been about £900,000,000. Actually it was about £1,950,000,000., excluding the revenue from foreign investments. In the words of Mallock 'the mind of the larger employers was the primary producer of an income of some £1,050,600,000 added to an income that would have otherwise have been £900,000,000 only.' Then he shews conclusively that of this increment the representatives of Mind got only about £250,000,00 for themselves, including both profits and the interest on industrial capital.

"I have shown I hope that there cannot be anything essentially wrong in the existing system of the distribution of the produce of industry as between labour and capital. Labour cannot divide among itself any more than there is to divide, i.e., the total of what is produced. That is self-evident. It may attempt to seize the modest share of capital, but if it succeeds in doing so, that share dries up. If it confiscates capital itself it does not gain anything, for capital, without the directing minds to use it productively, ceases to be of advantage to anybody. The experiences in Mexico and Russia have shown what happens. The Bolsheviks of other countries will lead to the same end if they have their way. Why is it that while socialists are shouting from soap-boxes, inflaming the populace with irritant poisons, while doctrinaires who hold professorial chairs are issuing fallacies, while a motley crowd in Russia is performing the most cruel and disastrous experiment every known, we cannot drive into the heads of people that even as things are under the capitalistic system they get all they can, that they can get no more than they produce.

and that it is not the power of the mass but rather the minds of the few that have uplifted them to the stage of comfort that they enjoy to day, which is vastly superior to what it was a century ago. If the Marxian doctrine has been true labour would be paid now what it was 100 years ago, no more."

"It is of profound importance to make the millions of workers see things correctly, for they are blindly approaching a time when adverse economic conditions are going to drive them, and no socialistic rantings or paternalistic policies by the Government are going to help them. The world has become so much poorer by the squandering of wealth and manpower during the war that no advance in the scale of living is to be expected from it. The prospect is just the reverse. The farmer does not lose his cattle and install improvements in his house because of his loss. The people of a city do not become profligate buyers of automobiles after a conflagration has swept away their houses. No more do nations become prosperous because war has consumed their substance. Instead of labour holding what it has gained during the war it is probable that it will suffer a relapse to a condition inferior to what it held just before the war, although the unions will struggle bravely against it. Fortunately, we shall not see a loss of economic improvements, such as safety measures in industry, the provision of proper working quarters and conditions, because they are economic; but labour is in danger of losing the eight-hour day for the simple reason that it will have to work nine to ten hours in order to produce enough on which to live."

During the progress of the War, in order to differentiate in a popular way the aims of the belligerents, the word "Democracy" became almost a war-cry, like "Remember the Maine" in the Spanish-American War. Both cries served their purpose. "Democracy" is defined as "The form of Government in which sovereignty of the State is vested in the people, or indirectly, by means of representative institutions."

It is the ideal form of Government where "the people" are intelligent and educated on sound principles. If, on the other hand, the majority of the voters—the ruling class—are ignorant, badly led or imbued with false political

doctrines, it means the downfall of that State. Lenine is credited with stating that, of every one hundred of his followers, one is a Bolshevik, 39 are criminals and sixty are fools. We see the result in Russia to day—the most terrible famine and misery that a white nation has probably ever experienced, certainly since the Thirty Years' War.

We must be very jealous about extending the franchise to alien immigrants who become the ready and fanatical followers of irresponsible, self-seeking agitators.

The combinations of various classes of workmen into Trades Unions has undoubtedly been the means of bettering the living conditions and wages of the members, by bringing to the attention of the public the defects in those conditions. These successes have naturally led enthusiastic members to aspire to greater things, until the public who are neither employers or employees in the union sense feel that the limit has been passed, and that, in many cases, the power of the unions is being exercised unwisely and selfishly.

The hope for further progress in trade unions appears to depend on the ability of their leaders to recognize the necessity of instilling sound knowledge into their memberships, with a sense of their duties and responsibilities to the public as well as their rights. These duties include increasing efficiency with increasing pay and decreasing hours of labour. Otherwise, there is no limit to the high cost of living which, in the last analysis, depends largely on the high cost of loafing. Co-operation among all classes and nations there must be if we are to escape the downfall of civilization.

The result of the feeling mentioned, on the part of the public, is the tendency to form unions in other walks of life for self-protection, such as the "Middle Classes Union" in London; or to secure proper recognition of the professions by the public and the Government through legislation.

Doctors, lawyers, dentists and land surveyors have long enjoyed legislative protection, doubtless to the great benefit of the whole community.

The engineering profession is so all-embracing that much difficulty has been found in framing suitable legislation in the past to meet the manifest requirements of the profession.

Engineering Legislation

Last April, however, in obedience to the Resolution passed at the last Annual Meeting, a Committee from the whole Dominion met in Ottawa and drafted an Act for submission to the several Provincial Legislatures. We are advised that much progress has been made looking toward the enactment of this legislation and that our individual members in each Province are co-operating with the members of the Mining Institute and other members of the profession who are not enrolled on our list.

This is not a new movement. I think I remember it as quite a lively subject of debate in the old Society meetings thirty years ago, and I read that it was seriously under discussion by the Institution of Civil Engineers about the same time.

In the United States ten individual States have enacted laws licensing or registering engineers. Eighteen States require the licensing or registering of architects, and six States require the licensing or registering of land surveyors. These laws overlap in a confusing manner, are not all uniform and are likely to prove very embarrassing and annoying to engineers whose activities extend beyond the limits of a single State. Consequently, the Engineering Council has made a report, dated December, 1919, recommending a uniform registration law. In this they have followed the precedent of *The Engineering Institute of Canada* and the great engineering societies in England.

The Institution of Civil Engineers is endeavoring to have passed legislation to make it illegal for local Government authorities to expend public funds upon works unless under the supervision of a properly qualified engineer; also to obtain statutory powers to prescribe the qualifications and to conduct examinations for admission to the profession of Civil Engineers; to keep a register of civil engineers, and to prevent persons who are not duly qualified from holding themselves out as members of that profession.

In this connection, we must consider the difficulty caused by the confusion in the popular mind between the professional engineer and the skilled artisan (often a member of a trades union) who, in England, is defined as an "engineer." A possible solution in Canada is a more distinctive name for our *Institute*.

During his recent visit to Canada, His Royal Highness, the Prince of Wales, graciously honoured our *Institute* by consenting to become an Honorary Member. This distinction I am sure is a subject of much pleasure to all our Membership, and especially to those who had the honour of serving with His Royal Highness in the late War.

Activities of the Institute

Your Council has taken an active and, we believe, a useful part in endeavoring to obtain reasonable salaries for members of the engineering profession employed in the Government service.

A Committee of your Council waited several times upon the Civil Service Commission and the Minister to present the case of our members,—we believe with very good success. The Act when passed will, of course, not be perfect nor meet the views of all our members, but in the Act is provision for further consideration of individual cases of injustice, so that they may be dealt with from time to time.

Your monthly "*Journal*" is now well established and is commending itself very favorably to all the membership. Let us all help to increase its circulation among the profession and its usefulness to the utmost.

The financial statement shews a deficit for the year, due largely to extraordinary expense of legislation committee meetings and the starting of *The "Journal"*; but it is fully expected that this deficit will be speedily wiped off.

Government official recognition of *The Institute* was accorded by the Minister of Labour in granting representation to *The Institute* at the Industrial Conference at Ottawa in September, at which conference our delegates took part as representatives of the majority of the population who are neither employers nor labour unionists, but none the less are suffering on account of the disputes between these two classes.

The membership of *The Institute* during the past year has increased greatly in excess of previous years. It should be the aim of each member to get every qualified engineer of good character into our *Institute*. Those who

cannot qualify for full membership, may be very useful as Affiliates, who will find their association with our *Institute* of great service to them.

We now have Provincial Divisions of *The Institute* actively working, including eighteen very energetic Branches which are enthusiastically vying with each other in a friendly contest for the best results in increase in membership and the contribution of valuable papers.

Our endeavour should be to make this *Institute* more than ever a national society, and thus increase our prestige and usefulness to our country and to one another.

It should be our policy, even our duty, to do all we can to the end that engineers employed by Governments—Federal, Provincial and Municipal, and even industries as far as practicable,—shall be efficient and shall be Canadians; to insist on all machinery and supplies, the purchase of which we may individually control, being of Canadian manufacture.

Some years ago I was asked by a very prominent and capable engineer from the United States to take charge of the development of some important mines in a foreign country, which development would necessitate the installation of a large amount of machinery. The capital invested in that enterprise was largely English and American, with some interest from the country itself. I was given clearly to understand by this engineer that, in case I was appointed to the position, every dollar's worth of machinery required must be purchased in the United States. One reason then dawned upon me what this gentleman was frequently featured in U. S. technical journals as the most highly paid and prominent Mining Engineer in the world. Through unforeseen circumstances the project was deferred indefinitely; but I have often wished that Canadians generally—and particularly engineers—and those in control of the purchase of machinery and supplies for Canadian developments, were imbued with some of this spirit, even if it were not carried to such an extreme.

If you can afford a motor car, (few professional engineers can) see that it is made in Canada, and that the fruit on your table is grown in Canada. If your requirements cannot be purchased in Canada, get them from the Mother country, in preference to foreign countries.

The Engineer in Public Life

Take an active interest in Municipal and Government measures of an engineering nature. Do not be backward in assisting the public to understand the engineering and economic features of any project that may be under consideration by Municipal, Provincial or Dominion Governments. Your opinions will gain attention and respect if you are a disinterested critic.

The newspapers need your help. Their life blood is advertising, and that depends on circulation, and I am afraid circulation depends to a great extent on sensational head-lines and reading matter rather than on truth and sanity. The easiest and cheapest matter a newspaper can publish to increase its circulation is that which caters to sectional or personal prejudices, and the "Freedom of the Press" makes this form of attack difficult to correct. Undue prominence in head-lines and photographs is given to any radical or extreme utterance of even the most ignorant. Naturally, when any situation points to the possibility of a spicy article, merited or unmerited, at the expense of an industry, it is not neglected. A home industry is selected rather than a foreign corporation doing business in this country, and this tends to discourage our home enterprises to the advantage of foreign concerns. You can do much to correct this by advertising in papers that show a regard for truth and justice rather than in "The Morning Headliner," "The Evening Spasm" or "The Weekly Hysteria," even if the circulation be not so great.

If newspapers were obliged to attach the name of the writer to each article they publish the reader would be in a much better position to know what importance should be attached to the article, than under the present system. Such a practice would tend to produce a saner class of writers and greatly lessen social unrest. One shudders to think of the verdict of posterity on the sanity, wastefulness and sense of humour of our age if it is to be gauged by some examples of our daily and weekly newspapers stored in museums 100 years hence.

Progress of Engineering

Railroad construction all over the world was seriously affected by the war. In some cases it was completely suspended, in others retarded, and in a few exceptional

cases it was actually hastened by the war. Probably the most complete suspension occurred in Brazil, but with the return of normal conditions steps are being taken to resume operations. In China work was greatly retarded, but nevertheless about 800 miles of new construction was completed, the principal sections being a 140-mile section which will constitute a link in the line which it is proposed to unite South China and Peking, and a 60-mile branch feeder of the Trans-Siberian Railway in Manchuria. Financial arrangements were also made for a line across Southern Manchuria. In Siberia construction was carried on rapidly and the lines built have given practically a double-track railway from European Russia to Vladivostok. A number of feeders have also been constructed, opening up rich agricultural sections and important coal and iron fields.

In Africa remarkable progress was made in the construction of the Southern section of the Cape-to-Cairo route, the completed mileage now standing at 2600 miles from Capetown to Bukama on the Congo. To complete this transcontinental line now requires but the construction of 550 miles from the Congo to Lake Albert. The extension of the railway in East Africa to Lake Tanganyika, which was practically completed at the outbreak of war, affords a rail and water route across the centre of the Continent. A second East and West transcontinental line passes through Katanga, a rich mineral region in the Belgian Congo, and reaches the Indian Ocean at Beira. The British Expeditionary Forces laid a permanent, standard-gauge railway from Egypt into Palestine.

In Australia the work of construction on her east and west transcontinental line was carried on during the war. This line was begun in 1912 and was completed in 1917. 3500 miles of road were built in the Commonwealth during the years 1915-17, and over one-third of the mileage of her north and south transcontinental line is now in operation. All this in spite of the wonderful contribution of Australia to the Allied cause in the War.

In Canada the construction of our second and third transcontinental lines was nearing completion at the outbreak of war. Some work has been done in the building of feeders, and work on the Hudson Bay Railway, which was suspended during the war, will doubtless be resumed at an early date.

It is unfortunate that there are at this time a number of our members, especially returned soldiers, previously engaged on railroad construction, who are out of employment, and they are naturally looking forward rather anxiously to the future.

With the exception of necessary branch feeders and connections to complete and co-ordinate existing systems, Canada has built more railways than she immediately requires. Canada, on the other hand, is very deficient in good roads, and there is no class of men so fitted to undertake the construction of highways as engineers trained on railway construction when they have added to their qualifications a knowledge of the different kinds of materials required for road making on different soils, the most desirable surfaces to meet varying conditions of traffic; and have studied the best form of organization to carry along such work with the greatest economy.

As an indication of the future of highway construction, it is interesting to note to day the development of motor-truck haulage in the conveyance of freight, particularly household goods, from a home, say, in Hamilton or Toronto to another home in New York, returning with freight of a similar nature, in competition with the railroads. Such traffic between cities and towns in southern Ontario is reaching considerable proportions, and the time is not far distant when the Railway Commission will find it necessary to take this traffic under its control. At present it is profitable and promises to expand in much greater proportion than the mileage of good roads. Interurban electric railways do not serve requirements as do the motor trucks, and can not replace them (given good roads) even at the cost of a great extension of unprofitable investment therein.

In electric railway work, advance will be made in electrifying busy terminals, and the high cost of fuel will encourage the electrifying of some main line sections where dense traffic and convenient water power indicate.

The load on hydro-electric stations is generally very irregular, and where the flow of water is abundant it is possible that the spare power (during slack hours or days) might be used to heat reservoirs of water or oil for heating

buildings. I have read of such surplus power being used to heat boilers in Sweden to supplement the heat from very expensive coal.

The Scientific and Industrial Research Commission is carrying on a great deal of most valuable work of an engineering nature, such as the preparation of peat and the lignites of the Western Provinces to warrant their more extended use. This is a very promising field for the engineer.

Associated with this problem is the similar one of the coking of U.S. bituminous coals at well-selected centres, to produce coke for domestic and metallurgical purposes, gas for domestic lighting and heating and power transmission, and the saving of the valuable liquid by-products.

The transmission of power by gas made under these conditions may well supplement the transmission by electricity where comparative costs are favorable.

In metallurgy great strides have been made in the past few years, particularly in the flotation of minerals from the finely-ground ore by the aid of a small amount of oil and the formation of a froth. Wasted sand tailings in the Cobalt district, containing as low as $3\frac{1}{2}$ ounces of silver to the tons, are being re-ground and "floated" economically with an extraction of about 66% and a loss in tailings of under $1\frac{1}{2}$ ounces.

Canada has of late increased the range of her metallurgical manufactured products to include many alloys of iron with manganese, chrome, molybdenum, etc.

The refining of nickel, which has been carried on for some years in Canada in connection with the refining of silver, cobalt and arsenic, has recently been greatly increased by the operations of the International Nickel Corporation at Port Colborne. The British American Nickel Company is opening up its extensive refinery near Aylmer, P.Q.

Such industries have created a demand for Canadian-made soda ash, bleach, liquid chlorine, etc., which are now to be obtained in needed quantities.

The fixation of atmospheric nitrogen has been carried on at Niagara Falls, Ont., for some years as cyanimid,

and this same plant is now manufacturing sodium cyanide for the extraction of silver and gold from their ores and for insecticide purposes.

In all these technical industries may be found scope for the young engineer who is adaptable and ambitious.

In the industrial world, paper-making, iron and steel making, machine-shop work, etc., there are great opportunities for the energetic, resourceful engineer.

Ideals for the Engineering Institute

In conclusion, help the other fellow and you won't need help. Maintain, as you have always done, the dignity of the profession, even if the disproportion is at present very marked between your salaries and the pay of the unskilled labourer. Such conditions cannot be permanent.

Let us all help to make *The Engineering Institute of Canada* an institution of national pride. Do not discourage members from joining other Engineering Societies which they believe will be of service to them, but impress upon all professional engineers the duty of helping this *Institute* to be of service to Canada, to the Empire, and to their professional brethren.

We should increase the number of our Branches from eighteen to fifty and our membership from nearly 4000 to 10,000 and put the Engineering Profession where it properly belongs by virtue of the wonderful importance of its work in almost all branches of human endeavor.

